

STAPLE REMOVER

Field of the invention

This invention relates to an apparatus for removing staples from a stack of sheet materials or
5 from a solid substrate.

Background of the invention

There is a growing need for staple removing devices, as staplers is now a popular consumer
item. Many people use staplers, from builders, office workers, students at school, to the
10 people at home. While stapling sheets or solid substrates such as wood, there are times when
the staple needs to be removed because the staple is stapled in the wrong place, or there was a
need to add more sheets, or was not stapled properly such that staple was warped and would
not hold properly.

15 Many devices were created to remove staples. A pry type staple remover uses a chisel-like
tongue to wedge under the staple's arms to twist and dig the arms up, and the tongue is
wedged under the staple crossbar to lift and dig the whole staple up. Removing the staples in
this fashion requires a lot of time, a large number of actions, and it usually damages the
substrate. Also, it is sometimes unsuccessful in completely removing the staple, requiring
20 fingernails or pliers to complete the job.

A double jawed pincer type staple remover uses a pair of opposed arms with curved teeth
members that wedges under the staple crossbar to lift staple up. This type of remover has the
advantage over the pry type remover in only requiring one action to operate. However it
25 suffers from an additional disadvantage of requiring a large amount of force to operate
because the operator has to press the arms together at the position where there is no
mechanical leverage advantage from the opposed arms. Thus this remover is only useful for
small office type staples, and not heavy-duty staples. This large force results in unpredictable
behavior, since a small variation in the angle of application will result in uneven forces
30 distributed across staple crossbar so that only one arm is removed. Also, when the substrate is
especially thin and pliable, such as in the case of only a few sheets stapled together,
removing the staple using the double jawed pincer type often makes a mess of the substrate
and tears the substrate with the staple still attached to the torn pieces of substrate.

35 Thus it is desirable to have a staple removing device that does not require excessive force to
operate and minimises damage to the substrate.

Summary of the invention

In accordance with the present invention, an improved staple remover comprising:

a base member having a front end, a rear end, and a first section near the front end;

a lever member having a front end, a rear end, and a first section near the front end, the said

5 first section of the lever member is pivotally attached to the first section of the said base member;

a tongue;

means of lifting the staple from the substrate using the leverage from the lever member pivotally attached to the base member, is provided.

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In the preferred embodiment of the invention, the said tongue extends from the base member and is used to wedge under the staple crossbar. The means of lifting the staple from the substrate comprises of teeth which extends from the lever member, such that when the lever member is operated from a first position to a second position, the said teeth engages the

15 underside of the staple crossbar and lifts it from the substrate.

The present invention offers the user an easier way of removing staples by using leverage. The base member provides support, allowing the leverage operation to be performed on pliable and flexible substrates such as sheets of paper, and minimizing damage to the substrate.

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Additionally, the present invention can be combined with a stapler, either as an integrated part of the stapler, or attached to the stapler as attachments. This gives an additional benefit of making the staple removing device more accessible to the user, and preventing it from being easily misplaced. While the user is stapling, if a need to remove staples arises, the user will no

25 longer need to look for a separate device to remove the staples.

The present invention can be made from metal sheets, punched into the appropriate shape, and then bent into the appropriate form, thus it should not be expensive to manufacture. In the case where the present invention integrated with a stapler, since the same manufacturing

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processes to make the staple driving lever and the stapler base can be used to also make the base member and the lever member of the present invention, it should not add significantly to the cost of a normal stapler.

The present invention can be used to remove staples from pliable substrates such as sheets of

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paper, or solid substrates such as wood.

The above preferred embodiment and other variations and advantages of the present invention

will become apparent to those skilled in the art upon a more detailed description of the invention.

Brief description of Drawings

- 5 FIG. 1 is a perspective view of the preferred embodiment of the invention
- FIG. 2 is an exploded perspective view of the preferred embodiment of the invention.
- FIG. 3 is a side view of the preferred embodiment of the invention in the first position.
- FIG. 4 is an enlarged side view of the head section of the preferred embodiment of the invention at the point where a staple is about to be lifted.
- 10 FIG. 5 is an enlarged side view of the head section of the preferred embodiment of the invention at the point where a staple is completely removed.
- FIG. 6 is a perspective view of an embodiment of the invention combined with a stapler.
- FIG. 7 is an exploded view of an embodiment of the invention combined with a stapler.
- FIG. 8 is a perspective view of an embodiment of the invention attached to a stapler.
- 15 FIG. 9 is a perspective view of the attachments.
- FIG. 10 is a perspective view of an embodiment of the invention housed around a stapler.
- FIG. 11 is a perspective view of an embodiment of the invention where the lever member fits inside the base member, and where the base member is bent to provide a gap for the removed staple.
- 20 FIG. 12 is the front view of the embodiment of the invention where the lever member fits inside the base member, and where the base member is bent to provide a gap for the removed staple.
- FIG. 13 is a perspective view of an embodiment of the invention where the lever member fits inside the base member, and where washers are used to provide a gap for the removed staple.
- 25 FIG. 14 is the front view of the embodiment of the invention where the lever member fits inside the base member, and where washers are used to provide a gap for the removed staple.
- FIG. 15 shows an embodiment of the invention where the lever member fits inside the base member, and where instead of using grooves, the tongue made thinner.
- FIG. 16 shows an embodiment of the invention where the stapler remover is pushed instead of
- 30 pulled.
- FIG. 17 shows an embodiment of the pushed remover with the tongue on the lever member.
- FIG. 18 is an enlarged side view of pushed remover with the tongue on the lever member.
- FIG. 19 shows another embodiment of the invention combined with a stapler with narrower teeth.
- 35 FIG. 20 shows another embodiment of the invention attached to a stapler.
- FIG. 21 shows another embodiment of the invention housed around a stapler.

Detailed Description

Referring to FIG. 1, FIG. 2, FIG. 3, it can be seen that the preferred embodiment of the staple remover device according to this invention comprises of a base member 1, a lever member 2, a tongue 3, and teeth 4. The base member 1 is pivotally connected to the lever member 2 by a pin 5 that provides a leverage fulcrum point. It should be understood that other means of providing a fulcrum point for leverage such as rivets can be used for this invention, and is not limited to a pin. The tongue 3 extends from the front end of the base member 1 and is used to wedge under the staple crossbar. A groove 6 can be optionally etched into tongue 3 to indicate the point where the staple needs to be wedged up to for removal. The teeth 4 extends from the front end of the lever member 2. The teeth 4 is narrow at tip 7 and wider at top section 8. FIG. 1 and FIG. 3 shows the lever member 2 is at a first position where the teeth 4 is above the tongue 3 providing room to wedge a staple above the tongue 3. The front edges 9 of the teeth 4 are curved in such a way that when the lever member 2 is moved into a second position where the teeth 4 overlaps the tongue 3, the front edges 9 of the teeth 4 do not go below the baseline of the base member 1.

FIG. 4 and FIG. 5 illustrates the staple remover device in operation. FIG. 4 demonstrates the point where the staple 10 is about to be lifted. Although not strictly required, for the easiest operation, the user should first wedge tongue 3 under the staple crossbar 11, to provide room to allow the tip 7 of teeth 4 to go below the staple crossbar 11. A less effective way is to use a shorter tongue which ends at the point where groove 6 would have been etched, so that the user only need to press the tongue against the side of the staple crossbar 11. This less effective method relies on a angled knife-like edge on the tip of the tongue and the tip 7 of the teeth 4 such that when both the said tongue and said teeth are pressed against the staple crossbar 11, coupled with the force of the staple removing device against the substrate, the likelihood is that both the teeth and tongue will both go under the staple crossbar 11.

The user then lifts the lever member 2 into a second position so that the wider top section 8 of teeth 4 lifts the staple 10 from the substrate, as shown in FIG. 5. The front edges 9 of teeth 4 are curved such that it does not go below the baseline of base member 1, and thus do not interfere with or damage the substrate.

The base member 1 presses against substrate at the point where the staple 10 is stapled into the substrate, thus providing support and enabling utilization of the mechanical leverage advantage from the lever member 2 pivotally attached to the base member 1. The support provided by the base member 1 allows the leverage operation to be performed on pliable and flexible substrates such as sheets of paper, and minimizes damage to the substrate. To

minimize movement of the base member 1 against the substrate during the lever member lifting operation, a gripping material such as rubber can be attached to the underside of the said base member.

- 5 The following describes variations of the present invention. The basic operation and principles of the present invention remains the same, allowing for variations that will become clear in the descriptions.

FIG. 6 and FIG. 7 shows the present invention combined with a stapler device. All the
 10 necessary components of a stapler device will not be illustrated in this application, for two reasons: First, it is understood by the inventor that the manufacture of a stapler device is well known by those skilled in the art. Secondly, it will avoid confusion when describing the present invention combined with a stapler device. Referring to FIG. 6 and FIG. 7, the embodiment of the base member of the present invention is combined with the base 13 of a
 15 stapler. The embodiment of the lever member of the present invention is combined with the staple driving lever 14. To be consistent with the orientation introduced in the previous descriptions, the back end of the stapler base 13 is the end with the stapler anvil 12. The tongue 15 extends from the front end of the stapler base 13 and is used to wedge under the staple crossbar. The stapler base 13 is pivotally connected to the staple driving lever 14 by a
 20 pin 17 that provides a leverage fulcrum point. A groove 18 can be optionally etched into tongue 15 to indicate the point where the staple needs to be wedged up to for removal. The teeth 16 extends from the front end of the staple driving lever 14. The teeth 16 is narrow at tip 19 and wider at top section 20. FIG. 6 and FIG. 7 shows the staple driving lever 14 is at a first position where the teeth 16 is above the tongue 15 providing room to wedge a staple above the
 25 tongue 15. The front edges 21 of the teeth 16 are curved in such a way that when the staple driving lever 14 is moved into a second position where the teeth 16 overlaps the tongue 15, the front edges 21 of the teeth 16 do not go below the baseline of the stapler base 13, and thus do not interfere with or damage the substrate.

30 FIG. 8 and FIG. 9 illustrate another embodiment of the present invention as attachments to a stapler device. To be consistent with the orientation introduced in the previous descriptions, the back end of the stapler base 23 is the end with the stapler anvil 22. A tongued member 25 is attached to the front end of the stapler base 23. A teethed member 26 is attached to the front end of the staple driving lever 24. Various means of attachment can be used to attach the
 35 tongued member 25 and teethed member 26 to the stapler device, such as strong bonding glue, rivets, welding or screws screwed into screw holes in the tongued member 25 and teethed member 26, or any other attachment means that is obvious to those skilled in the art. The

stapler base 23 is pivotally connected to the staple driving lever 24 by a pin 29 that provides a leverage fulcrum point. A groove 30 can be optionally etched into tongue 27 to indicate the point where the staple needs to be wedged up to for removal. The teeth 28 extends from the front end of the teathed member 26. The teeth 28 is narrow at tip 31 and wider at top section 32. FIG. 8 and FIG. 9 shows the staple driving lever 24 is at a first position where the teeth 28 is above the tongue 27 providing room to wedge a staple above the tongue 27. The front edges 33 of the teeth 28 are curved in such a way that when the staple driving lever 24 is moved into a second position where the teeth 28 overlaps the tongue 27, the front edges 33 of the teeth 28 do not go below the baseline of the tongued member 25.

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In the normal operation of a stapler device, lifting the staple driving lever of a stapler exposes the contents of the stapler, and is an operation used to refill the stapler. To prevent lifting the staple driving lever in the staple removing operation, another embodiment of the present invention is presented. FIG. 10 shows an embodiment of the present invention housed around a stapler device. A lever member 37 is housed around the staple driving lever 36, and can be moved independently from the staple driving lever 36. Thus when the user is operating the staple remover, the user does not need to move the staple driving lever 36 of a stapler. To be consistent with the orientation introduced in the previous descriptions, the back end of the stapler base 35 is the end with the stapler anvil 34. The tongue 38 extends from the front end of the stapler base 35 and is used to wedge under the staple crossbar. The stapler base 35 is pivotally connected to the staple driving lever 36 by a pin 40 that provides a leverage fulcrum point. The lever member 37 is also pivotally connected by the pin 40. A groove 41 can be optionally etched into tongue 38 to indicate the point where the staple needs to be wedged up to for removal. The teeth 39 extends from the front end of the lever member 37. The teeth 39 is narrow at tip 42 and wider at top section 43. FIG. 10 shows the lever member 37 is at a first position where the teeth 39 is above the tongue 38 providing room to wedge a staple above the tongue 38. The front edges 44 of the teeth 39 are curved in such a way that when the lever member 37 is moved into a second position where the teeth 39 overlaps the tongue 38, the front edges 33 of the teeth 39 do not go below the baseline of the stapler base 35, and thus do not interfere with or damage the substrate.

FIG. 11 to FIG. 15 shows another embodiment of the present invention where the lever member 45 fits inside the base member 46. When the lever member 45 fits inside the base member 46, it is important to provide a gap for the staple when the staple is removed. FIG. 11 and FIG. 12 illustrates an embodiment where the gap is provided by bending the base member 46 at the section 48 near the pin 47. An alternative way of providing the gap is with the use of washers 55 as shown in FIG. 13 and FIG. 14. When the lever member 45 fits inside the base

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member 46, it is important to provide space to facilitate the passage of teeth 50 when the staple remover is operated. FIG. 11 to FIG. 14 shows an embodiment of the present invention where there are parallel grooves 54 in tongue 49 that facilitate the passage of teeth 50 when the lever 45 is lifted. FIG. 15 shows another variation where the tongue 56 is made narrower so that it is no wider than the distance between the teeth 50 of the lever member 45. Referring to FIG. 11 to FIG. 14, the base member 46 is pivotally connected to the lever member 45 by a pin 47 that provides a leverage fulcrum point. The tongue 49 extends from the front end of the base member 46 and is used to wedge under the staple crossbar. The teeth 50 extends from the front end of the lever member 45. The teeth 50 is narrow at tip 51 and wider at top section 52. FIG. 11 to FIG. 15 lever member 46 is at a first position where the teeth 50 is above the tongue 49 providing room to wedge a staple above the tongue 49. The front edges 53 of the teeth 50 are curved in such a way that when the lever member 45 is moved into a second position where the teeth 50 overlaps the tongue 49, the front edges 53 of the teeth 50 do not go below the baseline of the base member 46, and thus do not interfere with or damage the substrate.

FIG. 16 shows another embodiment of the present invention where the staple removing operation is performed by pushing the lever member 57 instead of lifting it. The base member 58 is pivotally connected to the lever member 57 by a pin 59 that provides a leverage fulcrum point. The tongue 60 extends from the front end of the base member 58 and is used to wedge under the staple crossbar. A groove 61 can be optionally etched into tongue 60 to indicate the point where the staple needs to be wedged up to for removal. The teeth 62 extends from the front end of the lever member 57. The teeth 62 is narrow at tip 63 and wider at top section 64. FIG. 16 shows the lever member 57 is at a first position where the upper edge 66 of the tip 63 of teeth 62 is flush the top of the tongue 60. The back edges 65 of the teeth 62 are curved in such a way that when the lever member 57 is moved into a second position where the tip 63 of teeth 64 is well above the tongue 60, the back edges 65 of the teeth 62 do not go below the baseline of the base member 58, and thus do not interfere with or damage the substrate. Another variation of this embodiment of the present invention is where the lever member 57 fits inside the base member 58 and grooves are provided in the tongue 60 to facilitate the passage of teeth 62.

FIG. 17 shows another embodiment of the present invention where the tongue 67 extends from the lever member 68. A groove 71 is etched into tongue 67 to indicate the point where the staple needs to be wedged up to for removal, and to hold the staple when the lever member 68 is lifted. The base member 69 is pivotally connected to the lever member 68 by a pin 70 that provides a leverage fulcrum point.

FIG. 19 to FIG. 21 illustrates other embodiment of the invention combined with a stapler device. The embodiments in FIG. 19 to FIG. 21 are very similar to the embodiments presented in FIG. 6, FIG. 8, and FIG. 10, respectively.

- 5 The main differences are: the distance separating the teeth 72; optional flange 80 in tongue 79; and optional notches 81 in teeth 72.

Referring to FIG. 19 to FIG. 21, the teeth 72 extends from front section of the lever member 73 such that right tooth 74 and left tooth 75 is closer to each other than the distance between
10 both sides of the first section 76 of the said lever member 73 near the pivot point 77; the said teeth 72 also closer to each other than the distance between the legs of a staple used by the said stapler. The narrower distance between the teeth 72 allows both of the said teeth to go under the crossbar of the staple when in the staple removing operation. There are parallel grooves 78 in the tongue 79 to facilitate the passage of teeth 72 when the staple remover is
15 operated. There is also an optional flange 80 protruding from the tongue 79 to prevent the staple from moving beyond the point where the staple can be removed. The flange assists in keeping the crossbar of the staple over the teeth 72 until most of the staple is removed. The same effect may also be achieved with optional notches 81 in teeth 72.